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UTAH DIVISION OF  
SOLID & HAZARDOUS WASTE

**LEHI CITY  
SAND PIT LANDFILL**

**PERMIT APPLICATION**

**DECEMBER 2003**

**Civil Science, Inc.  
768 East Utah Valley Drive  
American Fork, UT 84003  
(801) 756-8888**

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SAND PIT LANDFILL**

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# SECTION 1

**PART I - GENERAL DATA**

**UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY**

**DIVISION OF SOLID AND HAZARDOUS WASTE**

**APPLICATION FOR A PERMIT TO OPERATE A CLASS IV LANDFILL**

The applicant shall submit, in duplicate, an original permit application, a general report, and a technical report to:

Dennis R. Downs, Director  
Division of Solid and Hazardous Waste  
Utah Department of Environmental Quality  
P. O. Box 144880  
Salt Lake City, Utah 84114-4880

**PART I - GENERAL INFORMATION**

1. Name of Facility Lehi City Class IV(b) Landfill

2. Site Location NE 1/4 NE 1/4 Section 5 T5S R1E SLB&M

3. Facility Owner Lehi City Corporation

4. Facility Operator Lehi City Corporation

5. Contact Person Ron Anderson

Address 153 North 100 East

Lehi, Utah 84043

Telephone (801) 768-7100

6. Type of Application:

☐ Class IV (a) Landfill      ☒ Class IV(b) Landfill

☐ Initial Application      ☒ Permit Renewal

7. Property Ownership

R315-310-3 (1)(a)

Lehi City  
153 North 100 East  
Lehi, UT 84043

☒ Presently owned by applicant

☐ To be purchased by applicant☐ To be leased by applicant

Name N/A

Address \_\_\_\_\_

Telephone \_\_\_\_\_

James L. Hewitson, Lehi City Public Works Director  
(Name of Official) (Title)

Signature: Teresa J. Hewitt Date Jan. 5, 2004  
In the County of Utah, State of Utah, on this 5<sup>th</sup> day of January.

2004  
~~19~~\_\_\_\_, personally appeared before me, the undersigned notary,

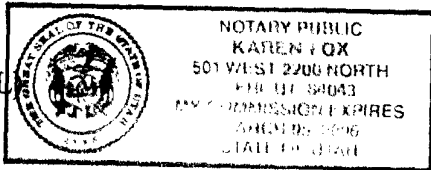
James L. Hewitson, who is the signer  
of the preceding document, and acknowledged to me that he signed it voluntarily for its stated  
purpose.

My commission expires on the 5<sup>th</sup> day of March, ~~19~~ 2006.

Karen Fox

Notary Public

(SEAL)





## **PART II - GENERAL REPORT**

### **FACILITY INFORMATION**

The Lehi Class IV(b) Landfill is an existing solid waste disposal facility located in Lehi City, Utah. The landfill is in a semi inactive state servicing only the needs of the city's public works operations. The facility accepts construction demolition waste, yard waste, and inert waste for disposal. This Application for a Permit to Operate a Class IV(b) Disposal Facility at the Lehi landfill has been prepared in accordance with applicable State of Utah solid waste regulations. This section will provide information regarding ownership, facility description and location, land use and zoning, waste stream characteristics, and facility administration.

Figures depicting site facilities are enclosed in Appendix A of this report.

#### **Owner and Operator Information**

The property on which the Lehi Landfill is located is owned by Lehi City Corporation. Lehi City has continuously operated the facility since prior to 1960. When the City began contracting solid waste removal in May, 1970, the landfill was placed on semi inactive status accepting only waste from city construction and demolition operations. A copy of the ownership deed is included in Appendix B of this report. The name, address and telephone number of the contact person at Lehi City regarding site ownership is:

Connie Ashton, City Recorder  
153 North 100 East  
Lehi, Utah 84043  
(801) 768-7100

Operations of the landfill are performed under the supervision of Mr. Ron Anderson, Superintendent of the Lehi City Streets Department. Mr. Anderson can be reached at the Lehi City Public Works Office:

Ron Anderson, Streets Department  
560 W. Glen Carter Drive  
Lehi, Utah 84043  
(801) 768-9167  
(801) 836-1070 (Cell)

### **Site Location**

The Lehi City Class IV(b) Landfill is located approximately one mile north of Interstate 15 and State Street on city street 300 West. The facility is located on 8.26 acres of land described in the public land survey as Beginning 994.56 feet south and 1237.51 feet west of the northeast corner of Section 5, T. 5 S., R. 1 E., S.L.B. & M., and running thence N. 62°42'28" E. 696.87 feet; thence N. 90°00'00" E. 280.00 feet; thence S. 00°00'00" E. 328.52 feet; thence S. 67°32'33" W. 828.23 feet; thence S. 89°59'26" W. 133.88 feet; thence N. 00°00'06" W. 325.43 feet to the point of beginning. Entrance to the site is approximately located at latitude 40°25' N. and longitude 111°51' W. The location of Lehi City in relation to state and county borders is presented in Figure 1. A Site Vicinity Map is included in Appendix A. Figure 2, Site Location Map, delineates the facility location with respect to Lehi City.

Pursuant to the provisions set forth in Section R315-305-2 of the Utah Administrative Code (UAC), a Class IV(b) landfill facility is not subject to the general location standards established for landfills as provided in Section R315-302-1 of the UAC.

## **Land Use and Zoning**

The landfill site is within Lehi City zoning boundaries designated as C (commercial) and A-1 (agricultural). The site has been in use as a landfill since before the current zoning was established and, therefore, this use may continue under Chapter 14 of the Lehi City Development Code - "Non-Conforming Uses, Buildings and Structures." Surrounding land use is primarily for agricultural to the south, light industrial to the north and low density residential to the east and west. Zoning boundaries for Lehi City are delineated in Figure 9, Lehi City Planning Zone Map, enclosed in Appendix C.

## **Facility Description**

The Lehi City Class IV(b) Landfill accepts construction and demolition waste from Lehi City projects for disposal. It also accepts wood and yard wastes from city operations and city related projects. Existing site features (including topography) are identified on the enclosed Figure 4 (Appendix C), Existing Facilities Plan. Discussion related to facility waste characteristics and disposal practices are presented in the Plan of Operations.

Waste placement at the landfill is intermittent. Waste is usually placed in the active area by city trucks. Cover material (which will be stockpiled) from on site will be placed as needed. As most waste is "heavy" and not organic, the need for intermediate or daily cover will be minimal.

## **Waste Stream Characteristics**

Lehi City Class IV(b) Landfill provides waste disposal capacity for city operations and city related construction projects. Lehi City will limit waste disposal at the Landfill to

approximately 250 cubic yards per month on an annual average over the remaining life of the landfill.

The Lehi City Landfill will remain a Class IV(b) facility and will be operated in compliance with the regulations for Class IV(b) waste landfill facilities as described in the Plan of Operations. Waste accepted for disposal at the site is comprised solely of inert waste, construction and demolition debris, wood and yard waste that meet the requirements of UAC Sections 26-32a-103.5 and R315-320-3 (a). Excluded wastes include, but are not limited to, scrap metal, household and commercial wastes, industrial wastes, liquids, sewage sludge, hazardous materials, contaminated soils, grease and waste oils.

Incoming waste loads will be logged for type of waste and approximate volume.

### **County Recorder**

In accordance with UAC R315-302-2(6), the location and nature of the landfill site will be recorded as part of the record of title with the County Recorder no later than 60 days after certification of closure. If required by local authorities, records may also include information regarding the dates of landfill operation, the amount of solid waste disposed at the site and the location of disposal areas.

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# SECTION 2

## **PLAN OF OPERATION**

Lehi City is submitting the following Plan of Operation for a Class IV(b) solid waste disposal facility at the site of the Lehi City Landfill as required by the general provisions for solid waste disposal defined in UAC R315-310-3 and R315-302-2 (2). This Plan of Operation presents the general procedures for the handling of various types of wastes which are accepted (or prohibited) for disposal at the facility, the intended schedule of landfill construction, inspections and maintenance, fire control and contingency plans in the event of a fire or explosion, litter prevention, procedures for controlling disease vectors, general training and safety plan for site personnel, and other information pertaining to the operation and maintenance of the facility. Information related to closure construction, post-closure maintenance care and financial assurance is presented in Sections 4, 5, and 6, respectively, of this permit application.

### **Construction Schedule**

The Lehi City Landfill utilizes the area fill method of solid waste disposal. Waste placement at the landfill currently takes place southwest of the center of the site. Waste accepted for disposal is compacted semi-annually, resulting in a fill that progresses in a northern and eastern direction. Soil cover is obtained on-site or from construction activities within the city where excess soil is generated. Existing site conditions are presented on Figure 3, Existing Facilities Plan.

Once the current lift reaches its northeastern limit, waste placement will commence in the northerly end of the hollow now used as a practice range by the Lehi City Police Department. Fill will then progress to the south with a 25-30 foot high lift. Soil cover will be obtained on

site. The proposed final grades are presented on Figure 4, Future Topography (Appendix A ). The access road and drainage facilities will be constructed during the operational life of the facility as the appropriate grades are reached during fill progression.

Given the intermittent nature of the waste disposal rate, the remaining site life is difficult to calculate. However, there remain approximately 77,600 cubic yards of storage volume left in the landfill.

### **Hours of Operation**

The Lehi City Landfill is opened only when the city transports its disposal wastes to the site. At all other times the facility is closed and the gate locked.

### **Site Personnel and Equipment**

UAC R315-305-5(2) requires that at least one person be on site during hours of operation and shall prevent unauthorized disposal during off-hours by controlling entry. Since deposition of wastes in the Lehi Landfill will be intermittent, there will be an authorized city employee during each waste deposit. At all other times, the landfill will be fenced, gated and locked.

The Lehi City Streets Superintendent will act as operations manager and will periodically visit the site and will be available for consultation during operations at the landfill. The Streets Superintendent is Mr. Ron Anderson. In the event of an emergency, Mr. Anderson should be notified. He can be reached at the following address and telephone number:

560 W. Glen Carter Drive  
Lehi, Utah 84043  
(801) 768-9167  
(801) 836-1070 (cell)

If Mr. Anderson is unavailable or if a situation requires further attention, the Lehi City Police or Fire Department should be notified by calling 911.

There is currently no equipment assigned to the Lehi City Landfill. Contouring and grooming operations are completed either by leasing a track dozer for city employees to operate or by contracting with an independent company for these services.

### **Access Control**

Lehi City shall provide fencing at the unit boundary (property boundary). There are currently two lockable gates at the entry points to the landfill. These gates will remain locked during all non-operating hours. An attendant will be on duty at the landfill during all operating hours. A perimeter fence has been installed along the full boundary of the landfill site as shown on the enclosed existing facilities plan (Figure 3).

### **Waste Handling Procedures**

Pursuant to UAC R315-302-2 (2), the Plan of Operation provides for a description of on-site solid waste handling procedures during the active life of the facility. The waste accepted at the Lehi City Landfill is comprised of inert waste, construction and demolition debris and yard waste. Excluded wastes include, but are not limited to, industrial wastes, liquids, sewage sludge, hazardous materials, household and commercial wastes, contaminated soils, grease and waste oils.

The quantity of incoming waste is visually estimated and recorded by city personnel stationed at the facility. Daily logs of all incoming waste are maintained and will be entered into the operating record.



### **Construction and Demolition Debris**

Construction and demolition (C&D) debris must be non-hazardous in order to be accepted; C&D debris is deposited at the active disposal face and periodically compacted (if possible), separated and covered with soil to prevent uncontrolled fires, rodent or vector harborage and differential settlement.

### **Yard Waste**

Yard waste is a general term used to refer to vegetative wastes which may include cuttings from trees and brush, grass clippings, straw and hay, and waste from seasonal or special events. Grass clippings, leaves and similar wastes are disposed of with C&D debris. Open burning of stockpiled tree limbs and woody yard waste will take place one time per year in accordance with Air Quality Rules Sub Section R307-1-2.4.4 (B)(5). Prior to any burning, Lehi City will obtain a permit from its local fire department.

### **Prohibited Waste Exclusion Program**

Wastes which are prohibited from disposal at the Lehi City Landfill include, but are not limited to, industrial wastes, liquids, sewage sludge, hazardous materials, household and commercial wastes, contaminated soils, grease trappings, waste oils, and dead animals. Pursuant to UAC R315-303-4 (7), an owner or operator of a landfill shall not knowingly dispose, treat, store or otherwise handle hazardous waste or waste containing PCBs (polychlorinated biphenyl). An owner or operator of a landfill shall include and implement as part of the plan of operations a plan that will inspect loads or take other steps as approved by the Executive Secretary that will prevent the disposal of hazardous waste or waste containing PCBs. These procedures include

random load inspections, training records of facility personnel, handling procedures for hazardous and PCB wastes and notification of the solid waste management authority.

### **Records of Inspection**

Records of all load inspections will be maintained in the facility operating records and made available to UDEQ on request. The “Record of Random Inspection” form, contained in Appendix D, will be used to record information obtained during each inspection. Inspection records will include, but are not limited to, the date and time waste loads were received and inspected, source or generator of the wastes, vehicle and driver identification, observations made by the inspector, description of rejected loads, and rationale for rejection.

### **Training of Facility Personnel**

All facility personnel will be trained in the identification of containers and labels typically used for hazardous and PCB wastes. Training for hazardous material screening procedures will address hazardous waste handling, safety precautions, and record keeping requirements. Documentation of personnel training will be included with the operation records for the facility.

### **Procedures for Handling Hazardous and PCB Waste**

If primary load inspections reveal the presence of regulated quantities of hazardous or PCB wastes on incoming haul vehicles, the landfill attendant will refuse to accept the load and UDEQ will be notified. If regulated quantities of hazardous or PCB wastes are identified during secondary load checks, random inspections, or at any other time, the Lehi City Fire Department will be called. The Lehi City Fire Department, acting as the first responder for hazardous

materials, will implement their Hazardous Materials Response Plan. Any subsequent activities related to the waste load, including transportation, storage, and containment will be managed by the Lehi City Fire Department. Landfill personnel will participate in these activities only as directed by the fire department. Following notification, it will be the responsibility of the fire department to ensure that the hazardous materials are handled, stored, or transported in accordance with applicable federal and state regulations.

In the event that PCB wastes are identified on-site, the Lehi City Fire Department or personnel from the Utah County Solid Waste Transfer Station in Lindon, Utah, will temporarily store and ensure disposal of the waste as required by 40 CFR Part 761, while completing the following activities:

- an EPA PCB identification number will be obtained;
- the PCB waste will be properly stored until transport;
- the containers will be properly marked with the words “Caution: Contains PCBs”; and,
- the container will be manifested for shipment to a permitted disposal facility.

If waste is transported off-site by a hazardous waste disposal company, a provisional or one-time U.S. EPA identification number will be obtained, the waste will be packaged according to applicable Department of Transportation regulations, and the container will be properly transported and manifested to its point of destination. Proper chain of custody and manifest documents will be obtained from the hazardous materials disposal facility in order to maintain compliance with all applicable federal and state regulations.

#### **Notification of the Solid Waste Management Authority**

The landfill operator will notify UDEQ within 24 hours if suspected hazardous materials or PCB wastes are discovered at the landfill. A record of notification will be submitted to UDEQ which identifies the date and time of discovery, type of material (if possible without analytical testing), probable hauler, an estimate of the quantity of material, and actions proposed for the removal of the material from the area of discovery. The record of notification will be entered into the operating record maintained at the facility.

### **Environmental Monitoring Systems**

UAC R315-303-4 and R315-305-2 state that owners or operators of a Class IV(b) solid waste landfill must design, construct, and maintain run-on and run-off structures to control the peak discharge from a 24-hour, 25-year storm event. Drainage areas and run-off patterns at the site through final closure, details of the structures used for run-on and run-off control, and engineering design calculations used to determine flow volume and appropriate sizes of drainage structures are contained in the Engineering Report for the Lehi Landfill. The report is included in this *Application for a Permit to Operate* the site in Section 3, and is maintained in the operating record for the landfill.

Construction of the surface water control devices described in the Engineering Report, in conjunction with dry waste management practices, and compaction of solid wastes, and the application of cover, increases the protection of waters of the State of Utah from a discharge of pollutants or contaminants during landfill operation. The surface water control devices and operational practices will be modified if it is determined that discharges from the site contain pollutants or contaminants which may degrade waters of the State of Utah.

## **Nuisance Control**

The Landfill will be operated in a manner which does not create odors, unsightliness, and other nuisances. The working face will be kept as narrow as possible while remaining consistent with safe and efficient operation. Bulky waste material will not be used for the final surface of side slopes.

Pursuant to UAC R315-303-4(4), a minimum of six inches of compacted earthen material will be used to cover the combustible solid waste at a frequency which is sufficient to prevent the uncontrolled migration of fires. The integrity of cover will be maintained until filling is resumed or final cover is constructed. Routine visual inspections of the cover material will be made, and all erosion surfaces, cracks, and depressions will be repaired as soon as is practicable.

Intermediate cover will be uniformly graded to promote drainage of surface water; all slopes will have a grade of not less than three percent.

## **Vector Control Program**

Pursuant to UAC R315-303-5(4), appropriate control and prevention of disease vectors at the Lehi Landfill will be used for the protection of public health and safety. Control and prevention are accomplished using techniques appropriate for the protection of public health and safety and the environment. Compaction and grading of waste at the active face prevents vector harborage in the waste mass. This waste management practice assures minimum exposure of wastes to potential disease vectors by reducing available entry space, food sources, and nesting locations. Rodent populations may be controlled by the use of poisons, smoke devices, or sonar techniques, if necessary.

Insect breeding areas, which may develop in areas of stagnant water or putrescible wastes, will be addressed as discovered. The presence of standing water at the facility will be minimized through the uniform grading of fill surfaces and the installation of a drainage control system. The accumulation of fluids in the waste mass will be minimized by the restriction of liquid wastes accepted at the landfill. If insect infestations occur in spite of these measures, approved insecticidal sprays or other methods may be employed.

### **Erosion and Dust Control**

Completed portions of the landfill will be configured and maintained as described in the closure and post-closure plans contained in Sections 4 and 5 of this *Application for a Permit to Operate* the site. Construction of a graded and compacted final cover, and subsequent revegetation, will help prevent erosion, surface deterioration, and fugitive dust generation. A water truck will be available on an as-needed basis to apply water to site roads and disturbed surfaces on the landfill property to control fugitive dust emissions.

### **Litter Control Program**

Litter control measures will be implemented at the Lehi Landfill in order to prevent scattering of lightweight debris. Litter collection will be performed on an as-needed basis by Lehi City Streets Department personnel or contracted day-laborers.

### **Scavenging/Salvaging**

Scavenging and salvaging at the Lehi Landfill are prohibited in all areas of the facility. This provision is enforced through the use of access control measures, perimeter fencing, and employee diligence.

### **Site Inspections**

The landfill attendant will conduct periodic site inspections for litter, scattered paper, and other lightweight debris. All recovered waste is returned to the active fill area for proper disposal. Quarterly site inspections will be performed and will include a visual inspection of drainage control systems, fill surfaces, perimeter fencing, and site equipment and structures. Quarterly inspection reports will be entered into the operating record for the facility. A copy of the quarterly inspection form is included in Appendix D.

### **Contingency Plans**

UAC R315-302-2(d,f,j) require the development of contingency plans to be implemented in the event of an emergency at the site. These plans must include an organized, coordinated, and technically and financially feasible course of action for response to fire or explosion, releases of toxic or hazardous material, landfill gas, failure of run-off containment system, and equipment breakdown. In addition, an alternative waste handling or disposal system must be developed in case the facility becomes unable to accept waste because of an emergency. The contingency plan for each of these occurrences is described below.

A general emergency operations plan has been developed for Lehi City. In addition, the Lehi City Fire Chief maintains a hazardous materials response plan. It is anticipated that one of

these plans will be invoked by City personnel if the severity of an event at the landfill facility requires the participation of an emergency response team.

In the event of an injury and depending on the severity of an injury, workers may either treat themselves, call the Lehi City Fire Department, or summon an ambulance. The injured worker is given discretion regarding whom to call and at what point. First aid kits will be maintained in all City and landfill vehicles. The Lehi City Streets Department Superintendent or the City Risk Manager will be notified in the event of more severe injuries, and will ensure availability of appropriate medical care. If an emergency response team is called to the site, site personnel will complete an incident report form and record the date, time, type of injury, actions taken, response time of the emergency management service, and the time at which the individual was evacuated from the site.

### **Equipment Breakdown**

In the event of equipment breakdown which cannot be repaired by the Lehi City personnel, a commercial repair facility will be contacted. Additionally, auxiliary equipment may be leased from a private contractor as required, or borrowed from other City departments.

### **Fire or Explosion**

On-site personnel are prepared to provide immediate fire suppression in the event of a waste or structure fire. Fire extinguishers are mounted on all site equipment and City vehicles. In the event of a fire at the active face or within the waste mass, stockpiled cover soils will be used to cover the burning or smoldering area. Water will not be applied to the active face unless absolutely necessary. In the event of an uncontrolled fire or a fire that cannot be managed by on-



site personnel, the Lehi City Fire Department will be contacted. The Fire Department is located in Lehi, approximately two miles from the landfill; estimated response time is approximately 10 minutes. On arrival at the facility, the Fire Department will assume responsibility for continued fire abatement activities.

### **Environmental Releases**

The Lehi City Fire Department will be called immediately and will act as the first response team in the event of hazardous or toxic material discharges at the Lehi Landfill. On arrival at the facility, the fire department will assume responsibility for subsequent activities related to the safe handling of the discharged material. Landfill personnel will not handle hazardous material spills, except under the direct supervision of the Fire Department or the emergency management team. The landfill attendant will ensure the safe evacuation of all employees and the public. Advanced planning of emergency exit routes is the responsibility of the operator. All employees will be regularly informed of established primary and secondary exit routes.

### **Facility Shutdown**

In the unlikely event of an emergency which requires the short term closure of the landfill, waste handling will be suspended until the emergency situation is resolved.

## **Personnel Training**

Personnel will receive training in landfill operations. Training of landfill personnel will be a continuing process including landfill operations, basic first aid, and safety training. Basic safety and first aid training will be conducted on an annual basis.

## **Record Keeping**

The operation of the Lehi Landfill is considered to be approved by UDEQ on issuance of a permit to operate. The following information will be recorded and maintained in the operating record for the Lehi Landfill, at the Lehi City Streets Department, and the Lehi City offices:

- records of inspections, training of personnel, and procedures for notifications to UDEQ relating to hazardous waste required by UAC R315-303-5;
- plans for closure and post-closure and any monitoring, testing or analytical data required by UAC R315-302-3 and R315-302-2(c); and,
- documentation of cost estimates and financial assurance required by UAC R-315-309-2(2).

Because leachate collection and ground water monitoring systems are neither installed nor planned for installation at the Lehi Landfill, documentation related to these systems will not be kept. The records of documentation related to the plans for closure and post-closure are included in this *Application for a Permit to Operate*, and therefore have been included in the operating record. The records of inspections, personnel training, and hazardous waste notifications, as well as any monitoring required during closure or post-closure activities, will be entered into the operating record as the information is developed. UDEQ will be notified when new documentation has been placed in or added to the operating record. All information will be made available to UDEQ upon request. Reports of the quantity of solid waste received at the Lehi Landfill will be submitted to UDEQ on an annual basis on forms supplied by UDEQ.

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# SECTION 3

## **TECHNICAL REPORT**

### **ENGINEERING REPORT**

This engineering report has been prepared in accordance with R315-310-4(2)(c) of the Utah Administrative Code (UAC).

#### **Maps, Drawings, and Specifications**

All maps and drawings are included in Appendices B and C of this permit application. Figures 1 and 2 illustrate the location of the landfill in relation to state and county boundaries and the City of Lehi. Figure 9 depicts the zoning of the landfill property and the surrounding land. Figure 3 illustrates the existing facilities and topography of the site. Base topography for Figures 3 and 4 was surveyed using USGS. Figure 4 presents the proposed final grading plan for the landfill. Figure 5 shows fill areas within the site. Figures 6 and 7 illustrate the off-site and on-site drainage sub-areas used to calculate run-on and run-off flows and design the drainage control system. No information is available from the Utah State Climatologist's Office or the mesonet concerning prevailing winds in the area of this landfill site. People living in the area say the wind predominantly blows from the north and northwest.

#### **Design and Location of Run-off and Run-on Control System**

The run-off control systems proposed for the Lehi Class IV(b) Landfill, illustrated on Figure 4 (Appendix A), have been designed to control and redirect the flow resulting from a 25-year, 24-hour storm event during the post-closure period. During the operating life, the application of daily and intermediate cover to exposed waste surfaces will minimize the volume

of contact water generated during precipitation events. Temporary berms will be constructed around the active disposal area to contain run-off flows which may come into contact with waste during disposal operations.

Run-on controls during the active life of the facility will include the construction of exterior and interior perimeter drainage along the perimeter of the landfill site. As a result of this run-on control feature, the amount of water entering or affecting the active disposal area will be limited to direct precipitation. Based on the favorable climate of the area and relatively low calculated flow velocities, all drainage channels will be native soil.

The rational method was used to calculate the total run-off for a 25-year, 24-hour storm. The entire landfill site of 8.26 acres was used as one drainage area as shown in Figure 7. Rainfall intensity was derived from the Precipitation Frequency Atlas of the Western United States - Volume VI - Utah (NOAA Atlas 2, 1973). The 25-year, 24-hour storm depth used was 2.2 inches, while a two-year storm depth of 1.0 inch was used.

The 8.26-acre site contains sandy gravel and gravelly sand soils. All drainage channels which collect and control on-site run-off were conservatively sized as 12-inch deep v-ditches with 2:1 side slopes. The drainage diversion ditch along the northern and eastern property boundary which diverts off-site run-on away from the facility footprint was conservatively designed as an 18-inch deep trapezoidal channel with 2:1 side slopes and a 12-inch base. The rational method predicts a maximum flow of 1.4 cfs in the channel on the south (lower) side of the facility. The total required retention capacity determined by this method is 14,200 cubic feet. The retention basin designed along the southwest corner of the property has a capacity of over 43,000 cubic feet before Fill Area A reaches capacity. A 2-foot tall berm will be placed along

the southern (lower) edge of each fill area as it is completed to create a permanent retention basin in each fill area.

### **Closure and Post-Closure Design, Construction and Maintenance**

A detailed discussion of closure and post-closure design, construction, and maintenance is included in Sections 4 and 5 of this application. The post-closure land use of the property is proposed to be a city park. During the post-closure care period, the perimeter fence will be removed and the site will be landscaped as a park.

### **Facility Zoning Status**

The landfill site is within Lehi City zoning boundaries designated as GC-2 General Commercial and PR-1 Parks and Recreation. Use of the site for landfiling purposes is consistent with the GC-2 zoning classification and the Lehi City Council will approve this landfill within the PR-1 zone classification. Surrounding land use is primarily low to medium density residential developments. Adjacent to the landfill site on the north are several Lehi City water storage tanks and reservoirs. Lands within one-half mile of facility property boundaries in all directions are primarily designated with zoning classifications R-1-8, RA-1, and A-1A. Lehi City zoning boundaries and classifications within three miles of the property boundaries are delineated in Figure 9, Lehi Zoning Map, enclosed in Appendix C.

### **Relationship to Solid Waste Management Plan**

All municipal waste with Lehi City is currently routed to the Utah County Solid Waste Transfer Station in Lindon, Utah. The Lehi Class IV(b) Landfill is solely designed for disposal of construction and demolition waste from the City of Lehi and will not accept municipal waste.

### **Compliance with R315-305**

Section R315-305 of the Utah Administrative Code defines general and operating requirements for the operation of a Class IV(b) landfill in the State of Utah. This section describes how the Lehi Class IV(b) Landfill satisfies those requirements.

- As described above, the Lehi Class IV(b) Landfill is not subject to the location restrictions defined in Section R315-302-1.
- With the submittal and subsequent approval of this *Application for a Permit to Operate a Class IV(b) Disposal Facility at the Lehi Landfill, Lehi, Utah*, Lehi City will obtain a permit to operate in accordance with R315-305-2(2).
- As described in Section 3, the Lehi Class IV(b) Landfill has been designed to collect and control the run-on and run-off resulting from a 25-year, 24-hour storm event as per Section R315-305-2(3).
- As required by Section R315-305-2(4) and described in the Plan of Operations, the landfill attendant will record estimates of the incoming volumes and types of waste disposed of at the site.
- Lehi City will comply with UAC R315-302-2(6) as described in Section 5 of this report regarding notations to the deed to the landfill property.
- The operation of the Lehi Class IV(b) Landfill meets with the requirements for operation established by R315-305-3, as described by the Plan of Operations in Section 2 of this permit application.
- The landfill will be closed in accordance with the Closure Plan described in Section 4 of this application.



**RB&G  
ENGINEERING  
INC.**

1435 WEST 820 NORTH  
PROVO, UT 84601-1343  
801 374-5771 Provo  
801 521-5771 SLC

December 29, 2003

D Warnock  
Civil Science  
788 East Utah Valley Drive  
American Fork, UT 84003

Re: Lehi City Sand Pit Landfill Site  
Slope Stability

Dear D:

At your request, an evaluation of slope stability for the proposed landfill design has been made. It is our understanding that the landfill is located in an area from which sand and gravel have been mined, and that the foundation soils consist predominantly of sandy-type soil, with groundwater deeper than 20 feet below the existing ground surface. We also understand that the maximum anticipated height of the landfill will be 35 feet, with side slopes no steeper than 2 horizontal to 1 vertical. Waste materials to be deposited in the landfill will include concrete, wood, and asphalt debris.

To evaluate slope stability, strength parameters have been assumed for the foundation and landfill material. It is our opinion that using a friction angle of  $32^\circ$  with 0 psi cohesion is conservative for the foundation sand. The strength parameters for the planned landfill are difficult to estimate prior to construction. It is our opinion that the friction angle of the landfill deposits will range from  $25^\circ$  to  $35^\circ$ , with apparent cohesion varying from 1 to 2 psi.

The slope stability analyses have been performed using a computer model of Spencer's Method developed by Stephen G. Wright at the University of Texas for the U.S. Corps of Engineers. Spencer's Method satisfies both force and moment equilibrium and is considered to be a satisfactory procedure for solving limiting equilibrium problems. The analyses assume that the upper 5 feet of the landfill will become saturated due to surface water.

Pseudo-static analyses were performed to evaluate the slope stability under seismic conditions. A recent report prepared by the U.S. Geological Survey indicates that the maximum acceleration having a 10% exceedance in 50 years in this area is about 0.20g. The recurrence interval for this condition is about 500 years. The maximum acceleration having a 10% exceedance in 100 years is



about 0.33g. The recurrence interval for this condition is about 1000 years. In performing pseudo-static analyses, 50% of the maximum peak acceleration is typically applied as a horizontal force along the failure surface. A pseudo-static coefficient of 0.15g was used in the analyses.

Shown in Figure 1 is the cross section used for the analyses, along with the failure surface representing the minimum factor of safety for each of the conditions analyzed. The results of the analyses are summarized in the following table:

RUN NO.	FRICTION ANGLE (degrees)	APPARENT COHESION (psi)	FACTOR OF SAFETY	
			STATIC	SEISMIC
1	25	1.4	1.58	1.16
2	30	1.4	1.78	1.30
3	33	1.4	1.90	1.38
4	33	1.0	1.74	1.32
5	35	1.4	1.97	1.43


It will be observed from the above table that the factor of safety for static conditions varies from 1.58 to 1.97, and the factor of safety varies from 1.16 to 1.43 for seismic conditions. A factor of safety of 1.5 is considered adequate for static conditions and a factor of safety greater than 1.0 is considered adequate for pseudo-static conditions.

Based upon the results of the analyses, it is our opinion that the landfill will have an adequate factor of safety for both static and seismic conditions, assuming a maximum height of 35 feet and side slopes of 2 horizontal to 1 vertical or flatter.

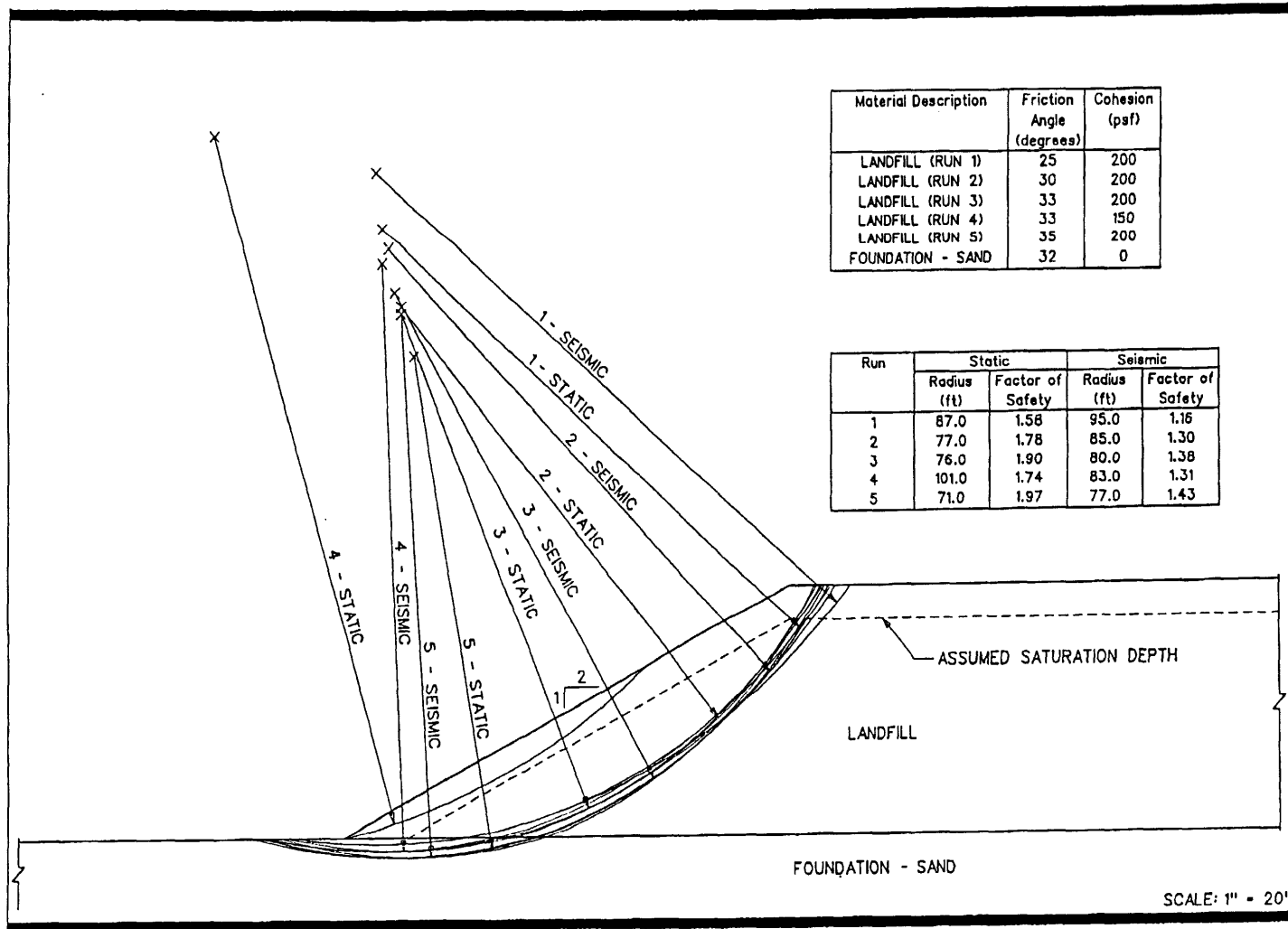
If there are any questions regarding the information contained herein, please call.

Sincerely,

RB&G ENGINEERING, INC.

  
Bradford E. Price, P.E.  
bep/jag





**RB&G  
ENGINEERING  
INC.**  
Provo, Utah

Figure 1 SLOPE STABILITY ANALYSIS  
Lehi City Landfill  
Lehi, Utah

# SECTION 4

## **CLOSURE PLAN**

This Closure Plan has been prepared for the Lehi Class IV(b) Landfill in accordance with UAC R315-302-3. Closure of the landfill will be performed in accordance with this plan, and in such a manner as to:

- minimize the need for further maintenance;
- minimize or eliminate threats to human health and the environment from post-closure escape of solid waste constituents, leachate, landfill gases, contaminated run-off or waste decomposition products to the ground, ground water, surface water, or the atmosphere; and,
- adequately prepare the facility for the post-closure period.

This plan and any future alterations or amendments to this plan will be maintained with the operations plan for the facility at the Lehi City Public Works offices.

### **Closure Construction**

The final cover will be constructed in accordance with UAC R315-303-4(4)(a). The final cover will consist of two feet of compacted native soil. Of these two feet, the upper six inches will be topsoil or other suitable soil which is capable of sustaining plant growth. The final cover will be revegetated with trees and grasses consistent with a city park environment, and graded to prevent ponding and minimize infiltration of run-off waters.

Based on the vertical and lateral design presented in the topographic maps in Appendix A, Lehi City will perform final cover placement at the end of the active life of each area of the landfill. Closure activities will be initiated when the development of the site reaches the final design height illustrated on attached Figure 4 (Appendix A). As a result, the size of the area to be closed will encompass the entire 8.26-acre limit of final cover placement. All

equipment which will not be used on-site during the post-closure period will be removed.

Structures at the site which remain after the final receipt of waste, and which will not be an integral part of post-closure site maintenance, will be dismantled and removed from the site.

Any soil contamination remaining after the final receipt of waste will be removed, treated, or disposed of according to applicable regulations. Following the final receipt of waste, any remaining stockpiles of recyclable or other stored materials will be removed from the site.

Rough contouring will be performed throughout the life of the site during daily operations. Following the general site cleanup described above, final contouring will be performed using waste and native soils to establish a suitable foundation for final cover construction. The site will be surveyed to establish base elevations for closure cap construction. After final grading of the foundation layer, the final cover layer will be constructed. Following the placement and compaction of a minimum of two feet of native soil, the landfill will again be surveyed to verify the final thickness of the final cover layer. As described above, the upper six inches of the final cover layer will be comprised of topsoil or a comparable soil which is capable of sustaining native plant growth. Following placement of the final cover, the site will be landscaped as a city park.

Drainage channels have been designed and will be constructed to accommodate the flow from a 25-year, 24-hour storm event. Much of the drainage system construction will be accomplished throughout the active life of the facility. Any drainage system construction which remains after the final receipt of waste, such as along the southerly line of the property against the proposed road, will be completed following the installation of the final cover described above. Interior and exterior perimeter drainage or drainage diversions will be constructed as defined in Section 3 and illustrated in Figures 6 and 7 (Appendix A). The drainage will assist in

maintaining the integrity of the final cover and preventing a washout of waste due to uncontrolled run-off during precipitation events.

### **Closure Schedule**

At least 60 days before the projected final receipt of waste, Lehi City will notify the Executive Secretary of the intent to close the Lehi City Class IV(b) Landfill and implement the closure plan. Within thirty days after the final receipt of waste, Lehi City will implement the approved closure plan. The closure activities described in this plan will be completed within 180 days of initiation. Following the completion of closure activities, Lehi City will submit to the Executive Secretary a set of as-built drawings of final closure construction.

### **Site Capacity**

The area-fill method of disposal is utilized as the Lehi Class IV(b) Landfill. Current operating plans are to continue filling in the west side (Area A of Figure 5) of the site until the area reaches the level of the existing land between Area A and Area B to the east. Filling will then commence against the north wall of Area B and continue south, north and west as the borrow pit is expanded to the southern limit of waste placement. The life of the facility is expected to be more than 50 years. In order to estimate the expected life of the facility, the following assumptions have been made:

- total landfilled waste is estimated at approximately 250 cy per month, 12 months per year;
- remaining volume of the existing landfill is 77,600 cy;
- waste to soil ratio is approximately 10:1.

The calculations indicate that the remaining portion of the existing waste area will provide approximately 77,600 cubic yards of waste disposal capacity lasting into the year 2024.

### **Final Inspection**

Following the completion of closure activities, a final report will be prepared and entered into the operating record of the facility. The report will summarize laboratory and field test data which support the conformance of the final cover installation and closure activities with the Utah solid waste regulations and the approved Closure Plan. The report will also include as-built construction drawings. The Executive Secretary will be notified of the completion of closure activities and arrangements will be made for a final inspection by UDEQ. Following final approval by UDEQ, the post-closure maintenance plan will be initiated pursuant to the approved Post-Closure Plan, outlined in Section 5 of this permit application.

### **Closure Construction Cost Estimate**

The closure cost estimate, detailed in Table I, has been prepared utilizing Appendix G of the Utah State Solid Waste Permitting and Management Rules as a general guideline. It is estimated that the site will be closed by parts, Area A and Area B. The cost estimate is based on the assumption that an outside contractor will perform the construction tasks and has been prepared using reasonable estimates of unit costs based on 2003 dollars. A ten percent contingency has been built into the final estimate to account for variances in unit costs and any possible unforeseen circumstances. Lehi City is complying with the Financial assurance requirements and provides annual proof that they can provide for closure construction and post-closure maintenance at the Lehi Class IV(b) Landfill.

TABLE I: COST ESTIMATE FOR CLOSURE CONSTRUCTION Lehi Class IV(b) Landfill				
ITEM	UNIT	\$/UNIT	#UNITS	COST
1. Topographic Survey	day	\$1,250	2	\$ 2,500
2. Contract Admin., Bidding and Award	L.S.	10% total cost	n/a	\$11,000
3. Project Management/CQA	L.S.	\$2,000	n/a	\$ 2,000
Engineering Subtotal				\$15,500
4. Water Truck	L.S.	\$5,000	n/a	\$ 5,000
5. On-site Final Cover Soil Acquisition	cy	\$1.50/cy	19400	\$29,100
6. Final Cover Placement	cy	\$0.50/cy	19400	\$ 9,700
7. Revegetation and Landscaping	acre	\$5000/acre	8.3	\$41,500
Construction Subtotal				\$85,300
Engineering Subtotal				\$ 15,500
Construction Subtotal				\$ 85,300
5% Contractor Fee (of Constr. Cost only)				\$ 4,265
1.5% Bond Fee (of Constr. Cost only)				\$ 1,280
SUBTOTAL				\$106,345
10% CONTINGENCY				\$ 10,635
TOTAL				\$116,980



# SECTION 5

## **POST-CLOSURE PLAN**

The Post-Closure Plan has been developed in accordance with UAC R315-302-3. Post-closure care and maintenance of the Lehi Class IV(b) Landfill will be performed in accordance with this plan, which provides for continued facility maintenance. The design of the Lehi Class IV(b) Landfill does not include a gas monitoring, ground water monitoring, or leachate collection system; therefore, the post-closure plan does not include provisions for gas or ground water monitoring. The office listed below may be contacted during the post-closure period regarding issues which concern the landfill property:

Lehi Public Works Director  
560 W. Glen Carter Drive  
P.O. Box 255  
Lehi, Utah 84043  
(801) 768-7120

### **Monitoring of Environmental Systems**

This permit application is submitted without provisions for ground water monitoring, surface water monitoring, or leachate collection or treatment systems. Exclusion of these items is based on the classification of the landfill as a Class IV(b) waste disposal facility.

### **Maintenance Activities**

Following closure of the Lehi Class IV(b) Landfill, which will result in a city park, the final cover and drainage systems will be inspected at least annually by personnel from Lehi City. The final cover and drainage system will be examined for the effects of erosion, subsidence, settlement, or other events which may compromise the integrity of the final cover or the

effectiveness of the drainage system. Necessary repairs will be completed as soon as is practicable following each inspection in order to maintain the effectiveness of the drainage system and restore the integrity of the final cover.

### **Post-Closure Schedule**

Post-closure activities will be initiated immediately following the completion of the closure activities described in Section 4 of this application. Post-closure activities will continue for a period of thirty years or a period established by the Executive Secretary. If post-closure monitoring activities indicate that the site has stabilized and does not pose a threat to human health or the environment, Lehi City may petition the Executive Secretary for a decrease in the length of the post-closure monitoring period.

Upon completion of post-closure monitoring activities as determined by the Executive Secretary, Lehi City will submit to the Executive Secretary a certification, signed by a city representative, which states why post-closure activities are no longer necessary. Following final approval by the Executive Secretary, post-closure monitoring activities will be discontinued.

### **Record Modifications**

Within 60 days after the completion of all closure activities, plats and a statement of fact concerning the location of any disposal site shall be recorded as part of the record of title with the County Recorder. The notation will serve to notify any potential purchaser of the property that the land has been used as a landfill, and that its use may be restricted by local land use or zoning regulations. Lehi City will notify the Executive Secretary that the deed notation has been recorded.

### Post-Closure Cost Estimate

The following post-closure cost estimate has been prepared utilizing Appendix G of the Utah State Solid Waste Permitting and Management Rules. Some of the assumptions used to derive the cost estimate include annual inspections of the integrity of the final cover and general site condition and hiring a third party to perform the inspections. The cost estimate for annual post-closure care is presented in detail in Table II below, and is based on 2003 dollars. A ten percent contingency has been built into the cost estimate. Lehi City will prepare documentation to provide financial assurance according to the Local Government Financial Test prior to the issuance of a *Permit to Operate* by the Utah Department of Environmental Protection. This will provide financial assurance for closure construction and post-closure maintenance at the Lehi Class IV(b) Landfill.

<i>TABLE II: COST ESTIMATE FOR ANNUAL POST-CLOSURE CARE Lehi Class IV(b) Landfill</i>				
ITEM	UNIT	\$/UNIT	#UNITS	COST
1. Site Inspection and Record keeping	hr	\$30	32	\$ 960
2. Correctional Plans and Specifications	hr	\$85	8	\$ 680
3. Maintenance Construction	hr	\$85	20	\$ 1,700
Subtotal				\$ 3,340
10% CONTINGENCY				\$ 350
TOTAL				\$ 3,690

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## SECTION 6

## FINANCIAL ASSURANCE

Lehi City will continue to provide annual proof of financial assurance to the State of Utah Treasurer's Office as a condition of the issuance of a *Permit to Operate* by the Utah Department of Environmental Protection. The City's financial standing will provide financial assurance for closure construction and post-closure maintenance at the Lehi Class IV(b) Landfill.

## REFERENCES

Merritt, F.S., 1996, Standard Handbook for Civil Engineers: Third edition, McGraw-Hill Book Company, New York.

# APPENDIX A



**LEHI CLASS IV (B) LANDFILL  
2500 NORTH & 300 WEST**

# SEPTEMBER 1998

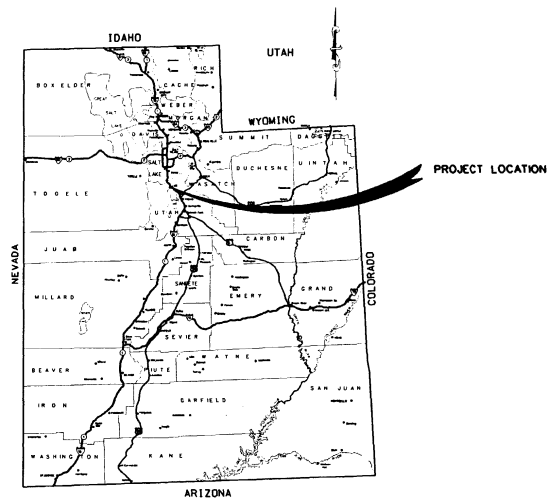
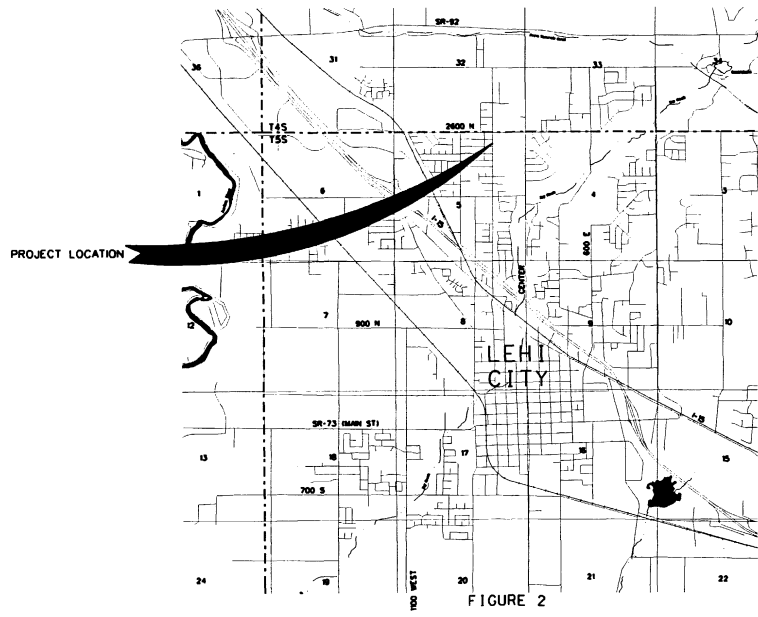
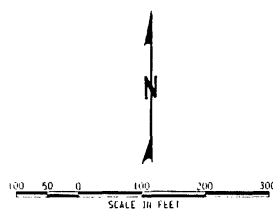
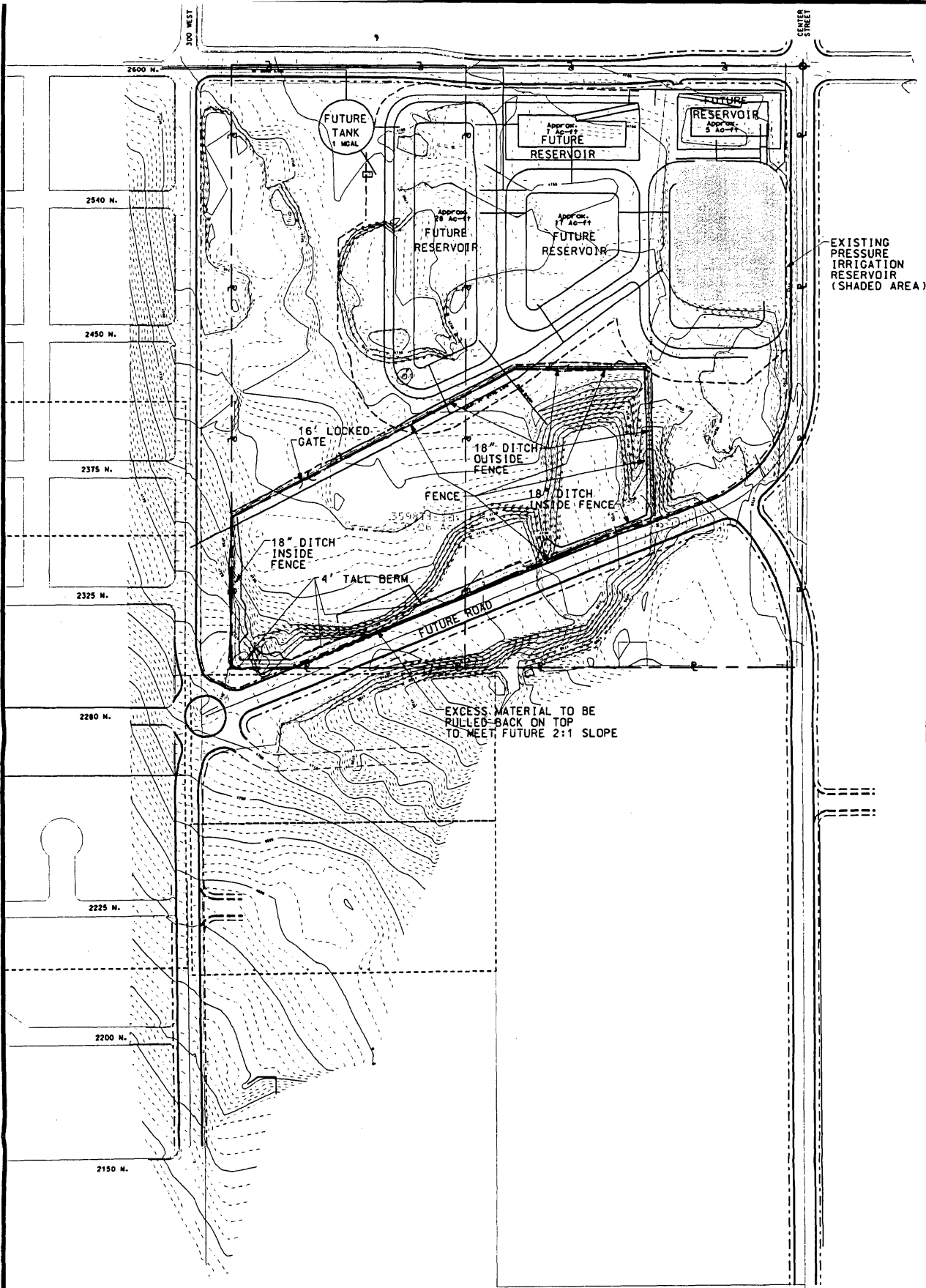
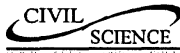


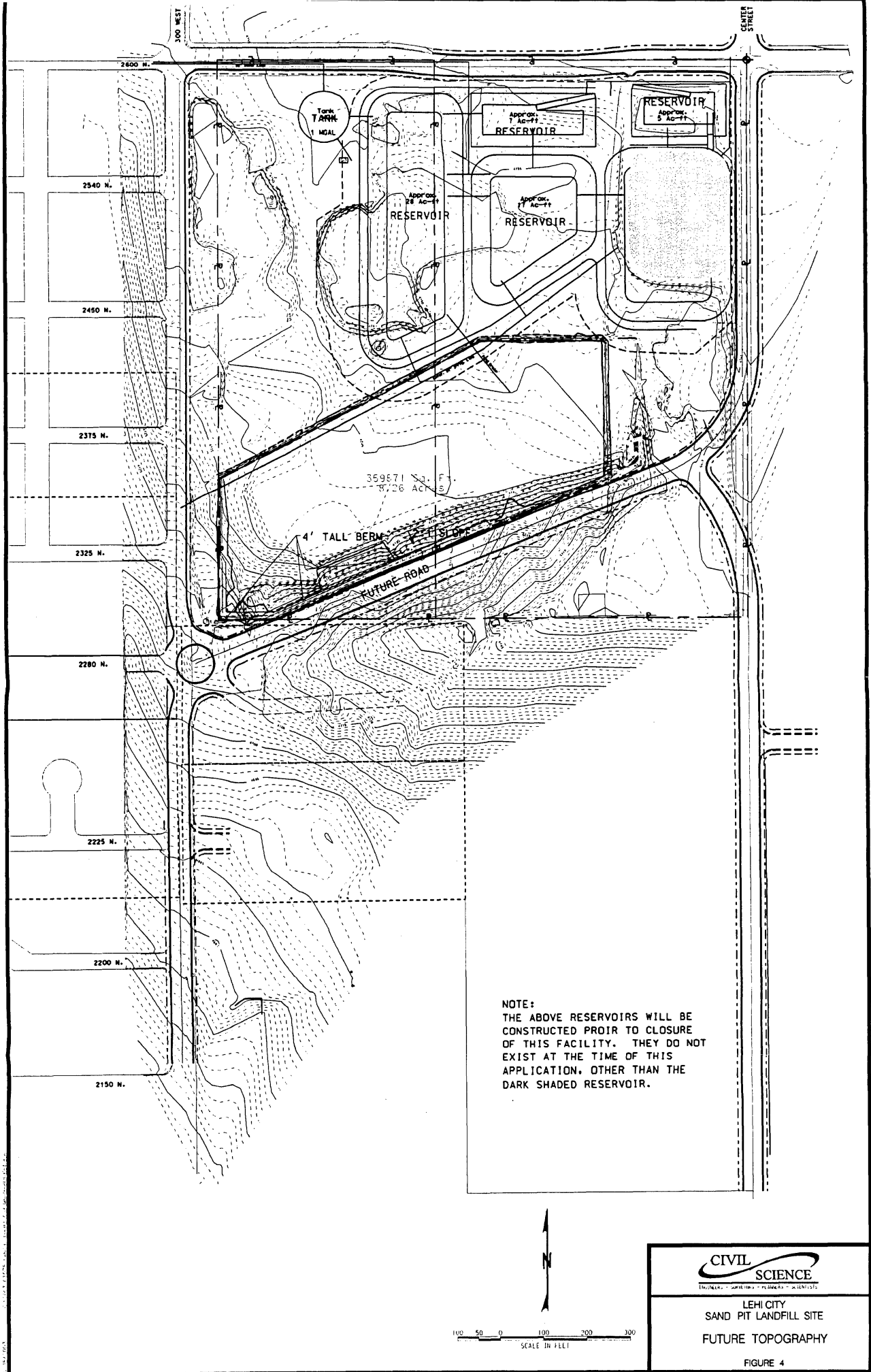
FIGURE 1

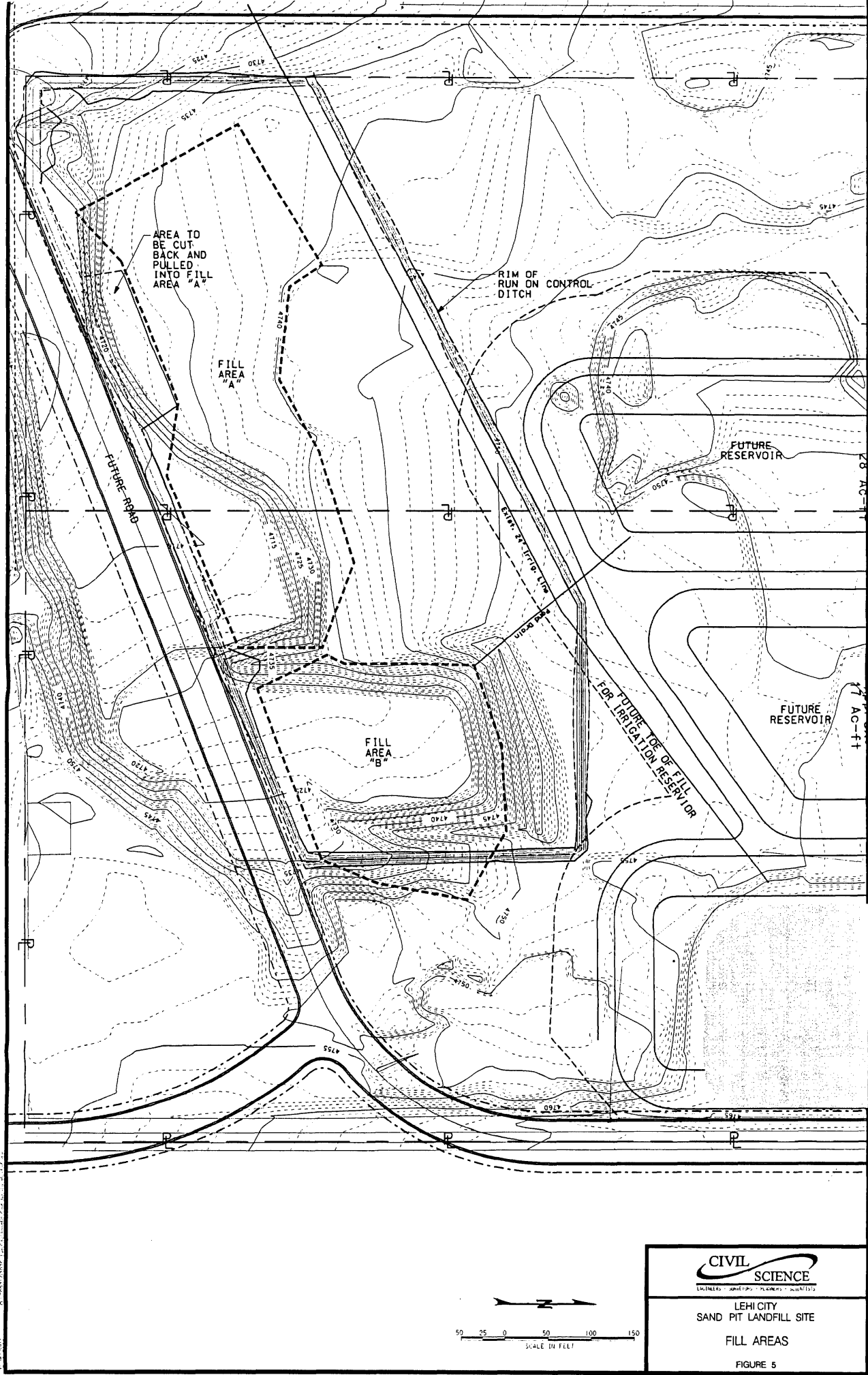


**CIVIL SCIENCE**  
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768 East Utah Valley Drive  
American Fork, UT 84003  
(801) 754-8338



 <b>CIVIL SCIENCE</b> <small>ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS</small>	LEHI CITY
	SAND PIT LANDFILL SITE
	EXISTING TOPOGRAPHY
	FIGURE 3

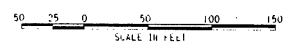
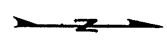
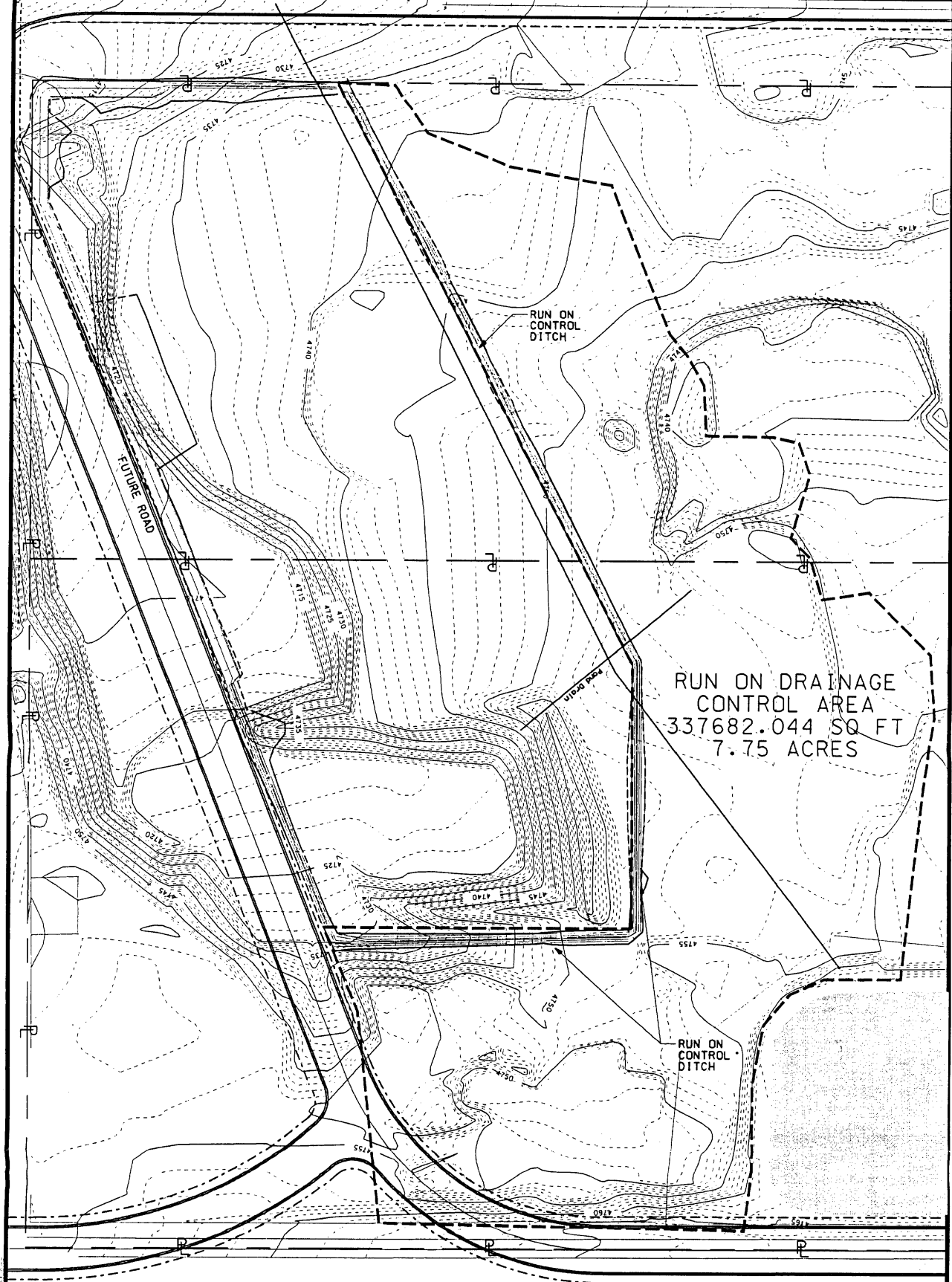




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LEHI CITY  
SAND PIT LANDFILL SITE  
FILL AREAS

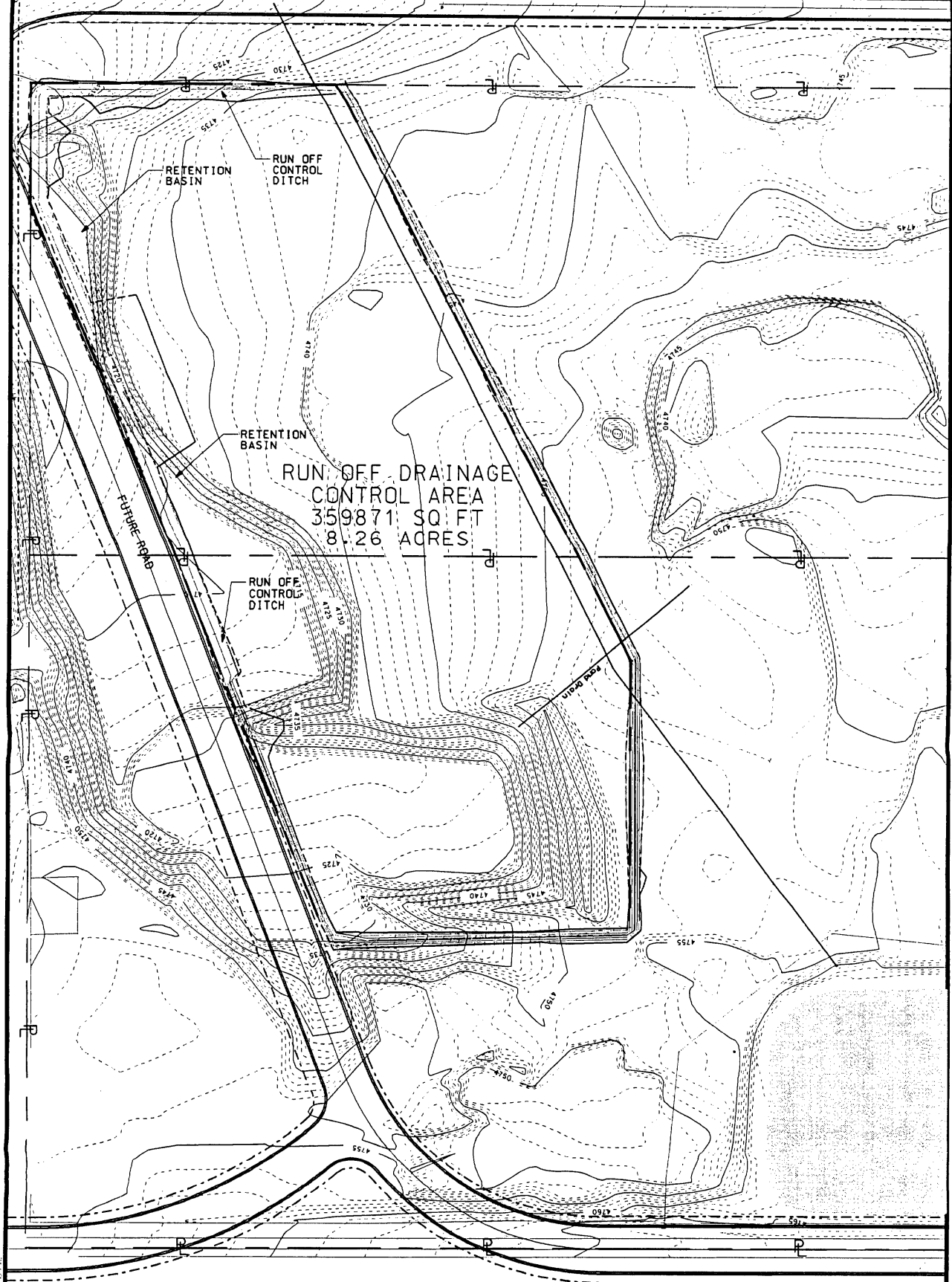
FIGURE 5



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ENGINEERING • SURVEYING • PLANNING • ARCHITECTURE

LEHI CITY  
SAND PIT LANDFILL SITE  
RUN ON DRAINAGE CONTROL

FIGURE 6



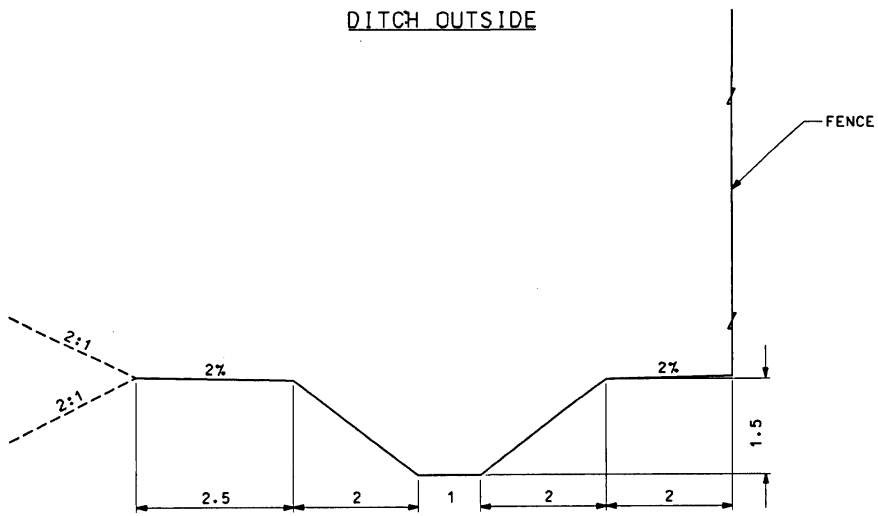
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ENGINEERS - ARCHITECTS - PLANNERS - SCIENTISTS

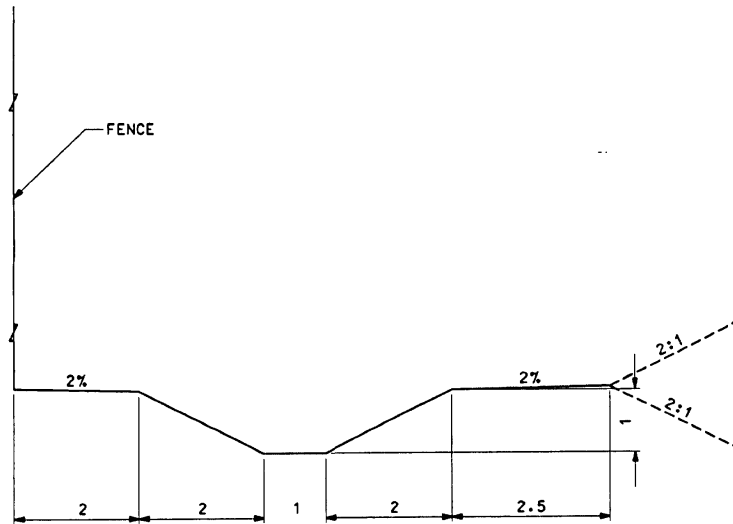
LEHI CITY  
SAND PIT LANDFILL SITE  
RUN OFF DRAINAGE CONTROL

FIGURE 7

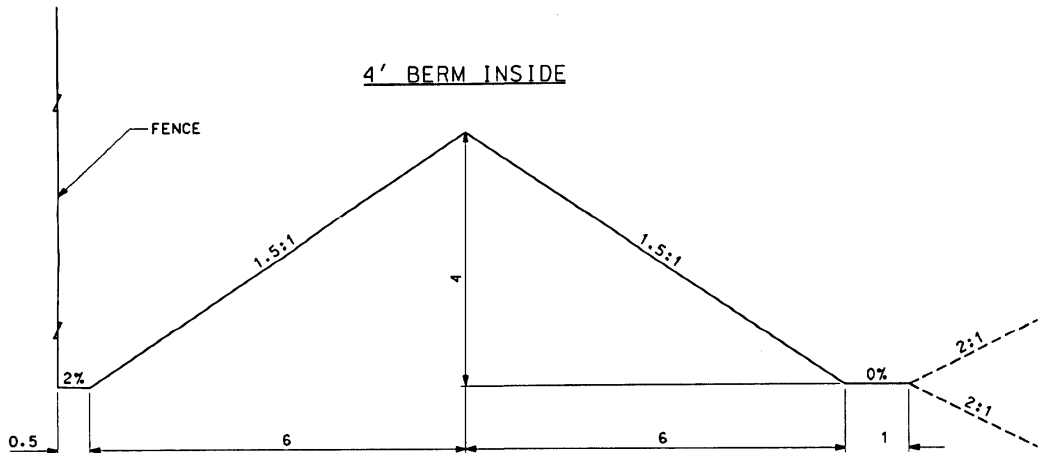
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### DITCH INSIDE



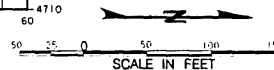
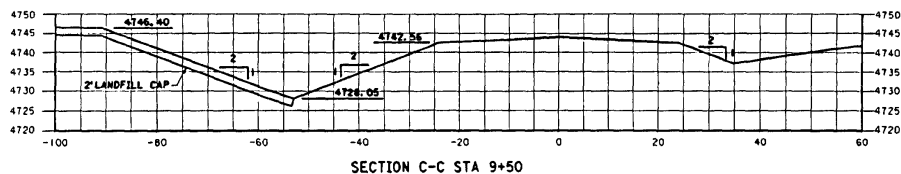
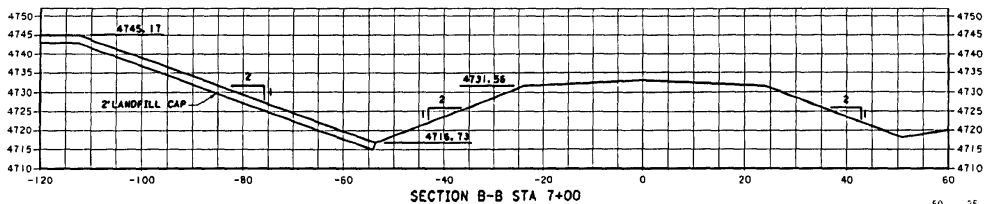
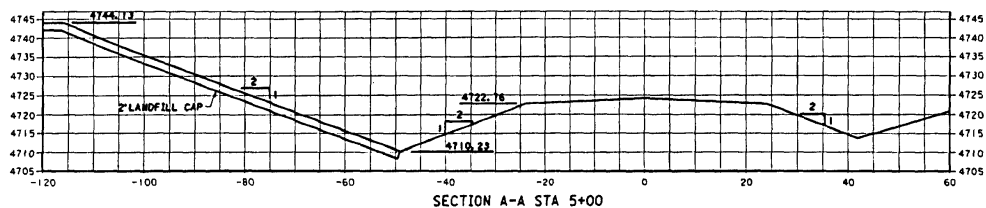
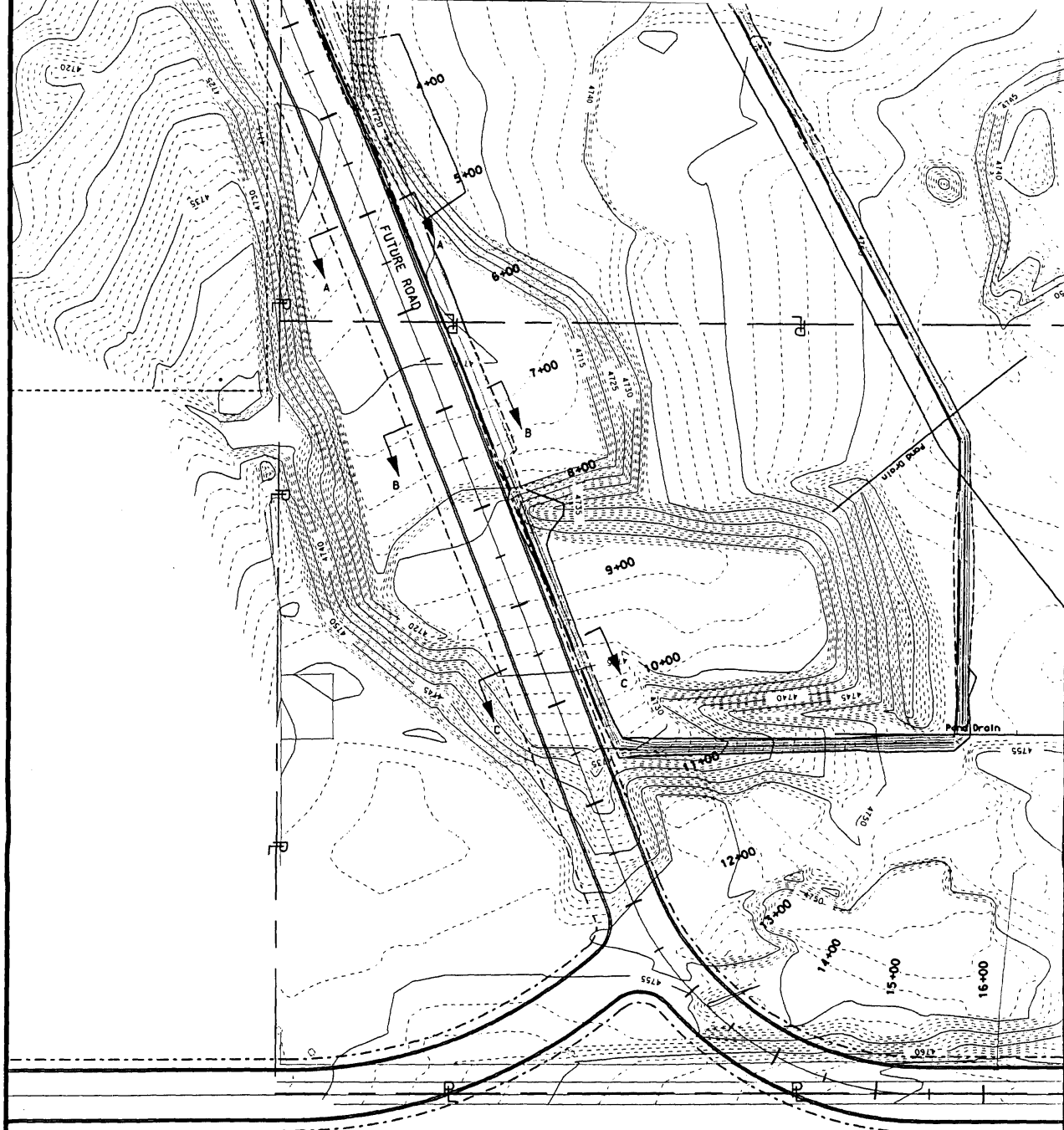
### 4' BERM INSIDE



**CIVIL SCIENCE**  
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LEHI CITY  
SAND PIT LANDFILL SITE  
TYPICAL SECTIONS

FIGURE 8



**CIVIL SCIENCE**  
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LEHI CITY  
SAND PIT LANDFILL SITE  
CROSS SECTIONS  
SOUTH EDGE OF LANDFILL  
AND FUTURE ROAD

FIGURE 9



## APPENDIX B

# UTAH COUNTY DEED RECORD 285

1369 Filed Mar 14 1931 at 9:20 A.M.

## QUIT-CLAIM DEED

JOSEPH J. SHAW AND SARAH A. SHAW, his wife Grantors of Provo, in the County of Utah State, hereby quit-claim to LEHI CITY, A Municipal Corporation Grantee of Lehi, Utah County, the sum of One Hundred Seventy and No/100 Dollars the following described tract of Lehi Precinct Utah County, State of Utah, to-wit:

Commencing 11 chains West of Northeast corner of Section 5, Township 5 South of Range E.T.M. thence West 7.75 chains; thence South 20 chains thence East 7.75 chains; North 20 chains to the beginning. Area 15.50 \_\_\_\_.

WITNESS the hand\_ of said Grantor\_ this 5 day of March A.D. 1931.

In the presence of

Joseph J. Shaw

Wiley Dunford

Sarah A. Shaw

OF UTAH )  
:SS. On this 5th day of March 1931, before me the undersigned a Notary Public within and for the County and State aforesaid, personally appeared Joseph J. Shaw and Sarah A. Shaw, his wife the signers of the foregoing instrument who duly acknowledged to me that they executed the same.

I further certify that my commission as a Notary Public will expire May 31 1934.

Willard L. Sowards Notary Public

(NOTARY SEAL)

Provo, Utah

UTAH COUNTY RECORDER

#####✓

603-  
WARRANTY DEED 71028  
Owen Dean and Amy Dean, husband and wife, Grantor s  
of American Fork, County of Utah, State of Utah, hereby CONVEY and  
WARRANT to Lehi City, a Municipal Corporation,

Grantee  
of Lehi, County of Utah, State of Utah, for the sum of  
Ten dollars and other valuable considerations, ~~DOLLARS~~.  
the following described tract of land in Utah County, State of Utah:

Commencing at the Northeast corner of the  
Northeast quarter of Section five, Township five,  
South of Range one East of the Salt Lake Base  
and Meridian; thence West eleven chains; thence  
South twenty chains; thence East eleven chains; thence  
North twenty chains to the place of beginning.

Area 22 acres.



WITNESS the hands of said Grantor s, this eighth day of December, A. D. 19 48.

Signed in the presence of

*[Signature]*

*[Signature]*  
*[Signature]*

STATE OF UTAH } ss.  
County of Utah }

On the 8th. day of December, A. D. 19 48, personally  
appeared before me Owen Dean and Amy Dean,  
the signer s of the within instrument, who duly acknowledged to me that  
they executed the same.



*[Signature]*  
Notary Public  
Residing at: American Fork, Utah  
My Commission expires: Aug 9-1951.

STANDARD SUPPLY CO., PRIMO, UTAH (Use black typewriter ribbon only)

231  
IN RE: REQUEST OF  
REC'D  
JAN 11 4 23 PM '49  
SEC.  
TP  
RECEIVED BY  
R  
LEHI, UTAH

## APPENDIX C



# APPENDIX D

# LEHI CLASS IV(b) LANDFILL

## QUARTERLY / PERIODIC INSPECTION LOG

[illegible]

# LEHI CLASS IV(b) LANDFILL

## RECORD OF RANDOM INSPECTION

DATE	TIME	INSPECTOR	LICENSE #	DRIVER'S NAME	MAKE/MODEL	ACCEPTED	UDEQ NOTIFIED?	UDEQ CONTACT
LOAD DESCRIPTION:								
IF REJECTED, RATIONALE FOR REJECTION:								
ACTIONS TAKEN:								



### DAILY ACTIVITY LOG

[illegible]